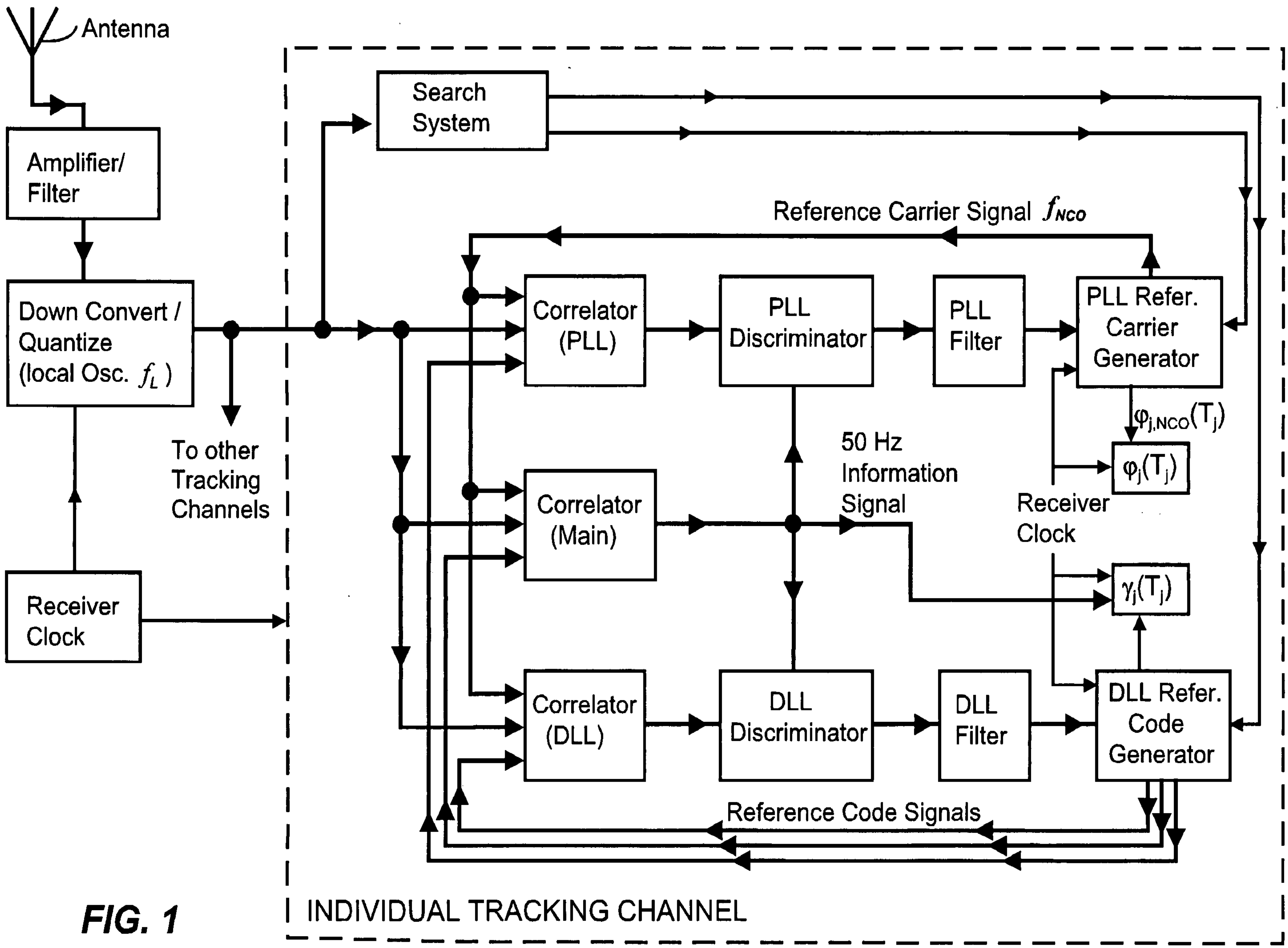

Antenna
Amplifier/ Filter
Down Convert / Quantize (local Osc. f_L)
To other Tracking Channels
Receiver Clock
Search System
Reference Carrier Signal f_{NCO}
Correlator (PLL)
PLL Discriminator
PLL Filter
PLL Refer. Carrier Generator
$\varphi_{j,NCO}(T_j)$
$\varphi_j(T_j)$
Correlator (Main)
50 Hz Information Signal
Receiver Clock
$\gamma_j(T_j)$
Correlator (DLL)
DLL Discriminator
DLL Filter
DLL Refer. Code Generator
Reference Code Signals
INDIVIDUAL TRACKING CHANNEL

FIG. 1

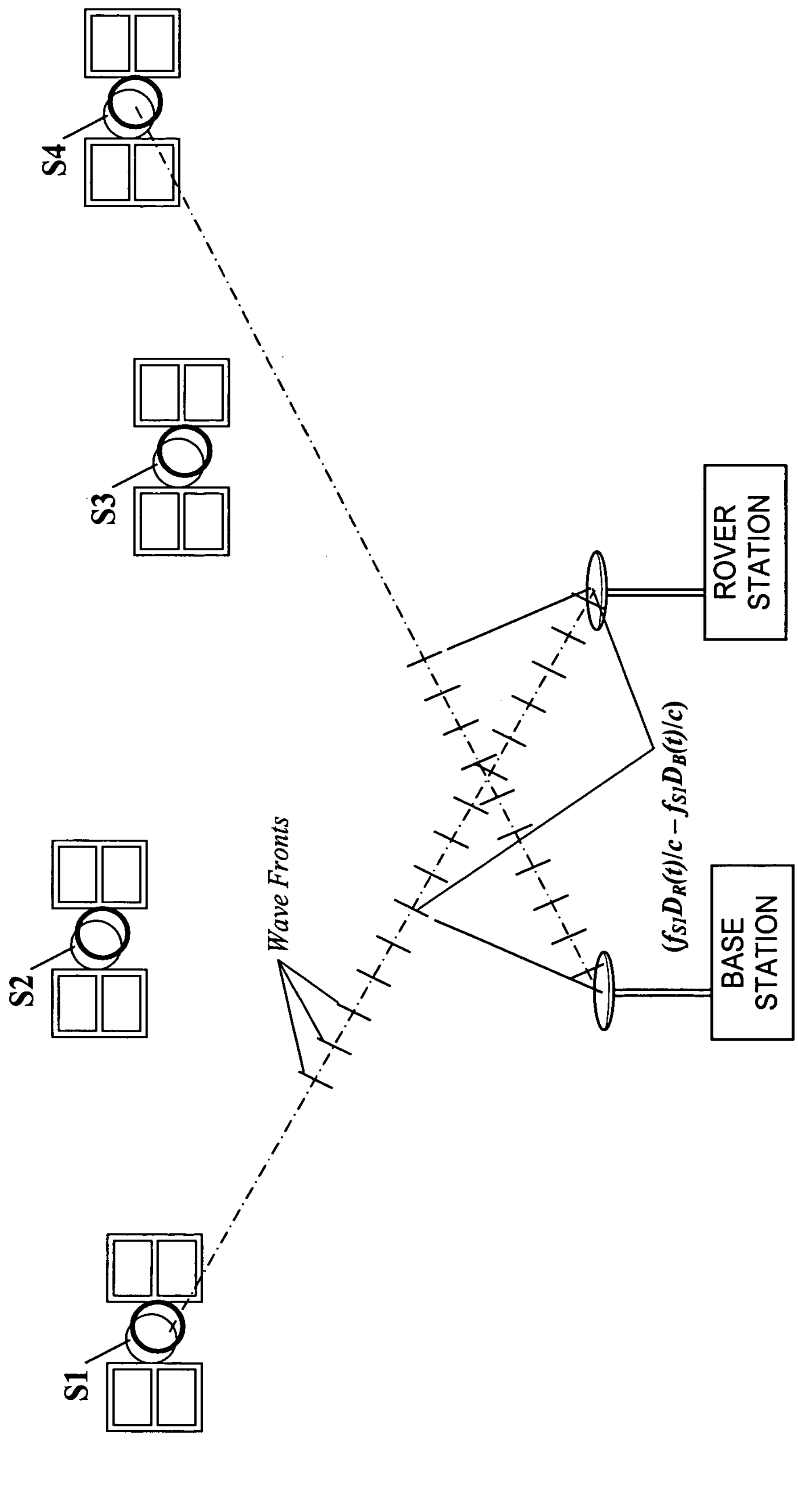

S1
S2
S3
S4
Wave Fronts
$(f_{S1}D_R(t)/c - f_{S1}D_B(t)/c)$
BASE STATION
ROVER STATION

FIG. 2

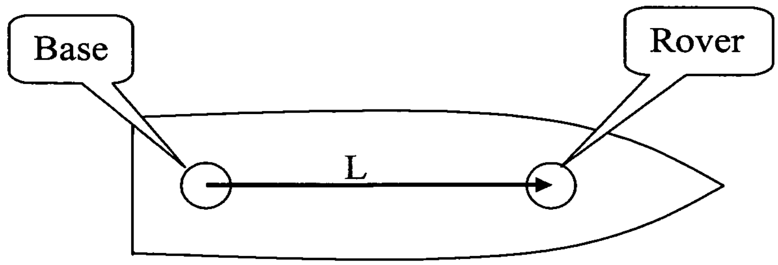


FIG. 3

41 Receive data (γ_i^B, γ_i^R, D_i^B, D_i^R, φ_i^B, φ_i^R, H_i^γ, optionally $\mathbf{r}_i'$ and L_{RB})

↓

42 generate, for each time moment j, a vector $\Delta\gamma_j$ of a plurality of range residuals of pseudo-range measurements made by the first and second navigation receivers in the form of: $\Delta\gamma_j = (\gamma_j^R - \gamma_j^B) - (D_j^R - D_j^B)$, the set of range residuals being denoted as $\Delta\gamma_k$, $k=1, \dots, j$

↓

43 generate, for each time moment j, a vector $\Delta\varphi_j$ of a plurality of phase residuals of full phase measurements made by the first and second navigation receivers in the form of: $\Delta\varphi_j = (\varphi_j^R - \varphi_j^B) - \Lambda^{-1}\cdot(D_j^R - D_j^B)$, where Λ^{-1} is a diagonal matrix comprising the inverse wavelengths of the satellites, the set of phase residuals being denoted as $\Delta\varphi_k$, $k=1, \dots, j$

↓

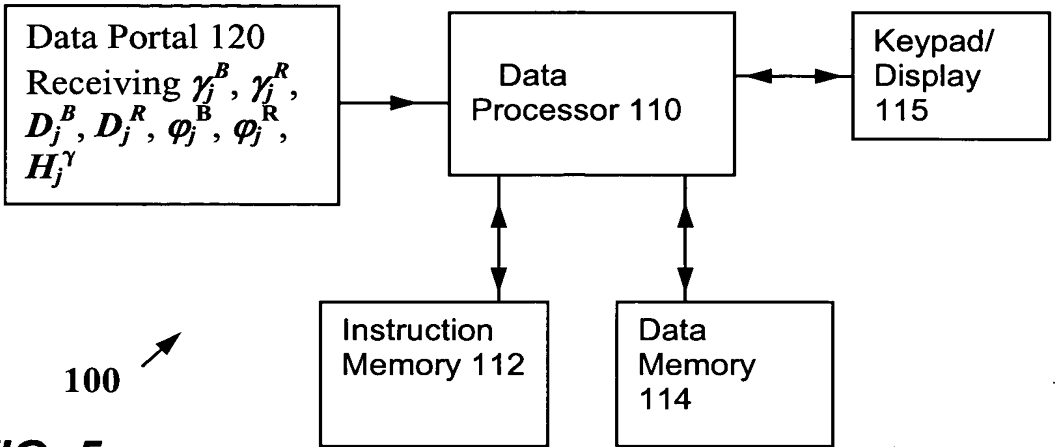
44 generate an LU-factorization of a matrix **M** or a matrix inverse of matrix **M**, the matrix **M** being a function of at least Λ^{-1} and H_k^γ, for index k of H_k^γ covering at least two of the time moments j

↓

45 generate a vector **N** of estimated floating ambiguities as a function of at least the set of range residuals $\Delta\gamma_k$, the set of phase residuals $\Delta\varphi_k$, and the LU-factorization of matrix **M** or the matrix inverse of matrix **M**

40

FIG. 4



100

FIG. 5

Instruction Set #1 directs data processor 110 to receive the measured data from data portal 120.

Instruction Set #2 directs the data processor to generate, for each time moment j, a vector $\Delta\gamma_j$ of a plurality of range residuals of pseudo-range measurements made by the first and second navigation receivers in the form of: $\Delta\gamma_j = (\gamma_j^R - \gamma_j^B) - (D_j^R - D_j^B)$, the set of range residuals being denoted as $\Delta\gamma_k$, k=1, ..,j

Instruction Set #3 directs the data processor 110 to generate, for each time moment j, a vector $\Delta\varphi_j$ of a plurality of phase residuals of full phase measurements made by the first and second navigation receivers in the form of: $\Delta\varphi_j = (\varphi_j^R - \varphi_j^B) - \Lambda^{-1}\cdot(D_j^R - D_j^B)$, where Λ^{-1} is a diagonal matrix comprising the inverse wavelengths of the satellites, the set of phase residuals being denoted as $\Delta\varphi_k$, k=1, ..,j

Instruction Set #4 directs the data processor 110 to generate an LU-factorization of matrix **M** or a matrix inverse of matrix **M**, the matrix **M** being a function of at least Λ^{-1} and H_k^γ, for index k of H_k^γ covering at least two of the time moments j

Instruction Set #5 directs the data processor 110 to generate a vector **N** of estimated floating ambiguities as a function of at least the set of range residuals $\Delta\gamma_k$, the set of phase residuals $\Delta\varphi_k$, and the LU-factorization of matrix **M** or the matrix inverse of matrix **M**

COMPUTER-READABLE MEDIUM

60

FIG. 6

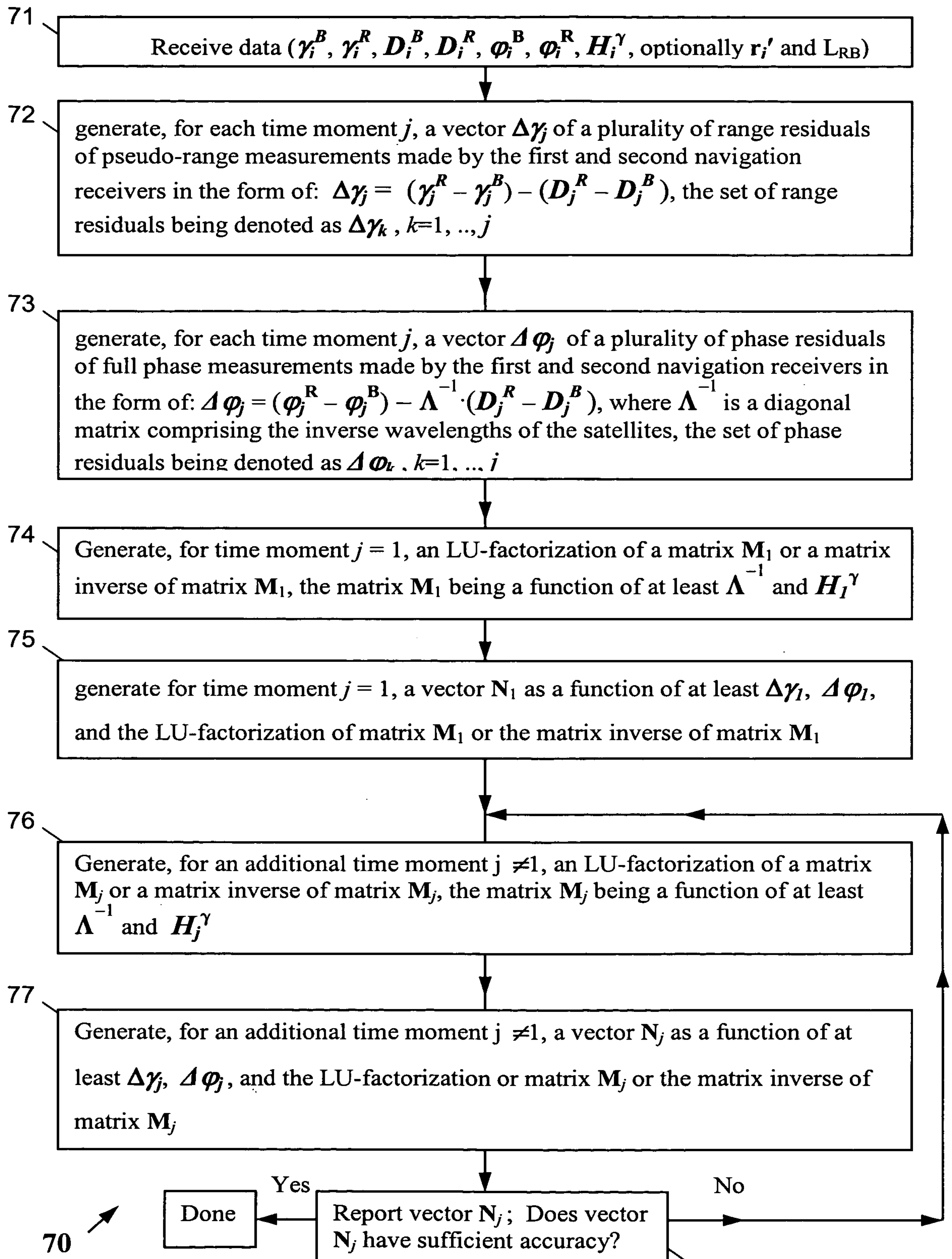

71
Receive data (γ_i^B, γ_i^R, D_i^B, D_i^R, φ_i^B, φ_i^R, H_i^γ, optionally $\mathbf{r}_i'$ and L_{RB})
72
generate, for each time moment j, a vector $\Delta\gamma_j$ of a plurality of range residuals of pseudo-range measurements made by the first and second navigation receivers in the form of: $\Delta\gamma_j = (\gamma_j^R - \gamma_j^B) - (D_j^R - D_j^B)$, the set of range residuals being denoted as $\Delta\gamma_k$, $k=1, .., j$
73
generate, for each time moment j, a vector $\Delta\varphi_j$ of a plurality of phase residuals of full phase measurements made by the first and second navigation receivers in the form of: $\Delta\varphi_j = (\varphi_j^R - \varphi_j^B) - \Lambda^{-1}\cdot(D_j^R - D_j^B)$, where Λ^{-1} is a diagonal matrix comprising the inverse wavelengths of the satellites, the set of phase residuals being denoted as $\Delta\varphi_k$, $k=1, ..., j$
74
Generate, for time moment $j = 1$, an LU-factorization of a matrix $\mathbf{M}_1$ or a matrix inverse of matrix $\mathbf{M}_1$, the matrix $\mathbf{M}_1$ being a function of at least Λ^{-1} and H_1^γ
75
generate for time moment $j = 1$, a vector $\mathbf{N}_1$ as a function of at least $\Delta\gamma_1$, $\Delta\varphi_1$, and the LU-factorization of matrix $\mathbf{M}_1$ or the matrix inverse of matrix $\mathbf{M}_1$
76
Generate, for an additional time moment $j \neq 1$, an LU-factorization of a matrix $\mathbf{M}_j$ or a matrix inverse of matrix $\mathbf{M}_j$, the matrix $\mathbf{M}_j$ being a function of at least Λ^{-1} and H_j^γ
77
Generate, for an additional time moment $j \neq 1$, a vector $\mathbf{N}_j$ as a function of at least $\Delta\gamma_j$, $\Delta\varphi_j$, and the LU-factorization or matrix $\mathbf{M}_j$ or the matrix inverse of matrix $\mathbf{M}_j$
Yes
No
Done
Report vector $\mathbf{N}_j$; Does vector $\mathbf{N}_j$ have sufficient accuracy?
78
70

FIG. 7

Instruction Set #1 directs data processor 110 to receive the measured data from data portal 120.

Instruction Set #2 directs the data processor to generate, for each time moment j, a vector $\Delta\gamma_j$ of a plurality of range residuals of pseudo-range measurements made by the first and second navigation receivers in the form of: $\Delta\gamma_j = (\gamma_j^R - \gamma_j^B) - (D_j^R - D_j^B)$, the set of range residuals being denoted as $\Delta\gamma_k$, k=1, .., j

Instruction Set #3 directs the data processor 110 to generate, for each time moment j, a vector $\Delta\varphi_j$ of a plurality of phase residuals of full phase measurements made by the first and second navigation receivers in the form of: $\Delta\varphi_j = (\varphi_j^R - \varphi_j^B) - \Lambda^{-1}\cdot(D_j^R - D_j^B)$, where Λ^{-1} is a diagonal matrix comprising the inverse wavelengths of the satellites, the set of phase residuals being denoted as $\Delta\varphi_k$, k=1, .., j

Instruction Set #4 directs the data processor 110 to generate, for time moment j = 1, an LU-factorization of a matrix $\mathbf{M}_1$ or a matrix inverse of matrix $\mathbf{M}_1$, the matrix $\mathbf{M}_1$ being a function of at least Λ^{-1} and H_1^γ

Instruction Set #5 directs the data processor 110 to generate, for time moment j = 1, a vector $\mathbf{N}_1$ as a function of at least $\Delta\gamma_1$, $\Delta\varphi_1$, and the LU-factorization of matrix $\mathbf{M}_1$ or the matrix inverse of matrix $\mathbf{M}_1$

Instruction Set #6 directs the data processor 110 to generate, for one or more additional time moments j $\neq$1, an LU-factorization of a matrix $\mathbf{M}_j$ or a matrix inverse of matrix $\mathbf{M}_j$, the matrix $\mathbf{M}_j$ being a function of at least Λ^{-1} and H_j^γ

Instruction Set #7 directs the data processor 110 to generate, for one or more additional time moments j $\neq$1, a vector $\mathbf{N}_j$ as a function of at least $\Delta\gamma_j$, $\Delta\varphi_j$, and the LU-factorization or matrix $\mathbf{M}_j$ or the matrix inverse of matrix $\mathbf{M}_j$

Instruction Set #8 directs the data processor 110 to report vector $\mathbf{N}_j$ as having estimates of the floating ambiguities, and to repeat Instruction Sets #6 and #7 if vector does not have sufficient (or desired) accuracy, or if it is desired to keep the process going even through sufficient accuracy has been reached.

COMPUTER-READABLE MEDIUM

80

FIG. 8